SOIL conservation

U. S. Department of Agriculture/Soil Conservation Service/December 1973

A look at the United States—from space

Land-use planning

The first broad national land-use program, which encourages states to exercise control over land uses of more than local significance, may become a federal law in 1974. These land uses are: (1) areas of critical environmental concern, (2) areas impacted by key facilities, (3) large-scale developments, and (4) areas proposed for developments of regional benefit. This law can add major new dimensions to the concept of environmental protection and social well-being.

It has become clear that many of the problems of maintaining environmental quality are difficult to resolve effectively in the absence of enlightened land-use policies. We need only to look around us to see that too many land-use decisions have been unwise; that too many have been based on short-term expediency rather than on long-term planning.

The Department of Agriculture recognizes that major responsibility for land-use planning rests with local and state governments. Through its agencies, including the Soil Conservation Service, the Department administers many programs that influence the land-use decisions of private land users—urban as well as rural.

The Department's research, educational, technical, and financial assistance services are available in every state and county of the nation. Its agencies assist many levels of government in land-use planning and implementation efforts, and its delivery system for land-use information is widespread.

Recently, Secretary of Agriculture Earl L. Butz issued a statement on land-use policy, a major part of which is printed in this issue of SOIL CONSERVATION. The statement outlines the assistance that the Department will provide to help assure the kind of land-use planning programs that can protect and improve the nation's natural resources.

A national land-use planning assistance act can be a critical component in any strategy for guiding or directing the way land is developed. It can provide an opportunity for federal, state, and local governments to redefine their roles in land-use planning and regulation, and to work together to formulate long-range solutions to environmental problems.

Kenneth E. Grant

SOIL conservation

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COVER: Puget Sound and Mount Rainier as seen from 565 miles in space. This is part of the mosaic the Soil Conservation Service compiled from imagery scanned by satellite (See p. 12). To the west of the Sound are the Olympic Mountains and to the east are the metropolitan areas of Seattle and Takoma, with Mount Rainier to the southeast.

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250.

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Altering Alabama's history

by W. B. Lingle
State conservationist, SCS
Auburn, Alabama

In 1819, the Alabama State Legislature chose Cahaba as the state capital. But a flood damaged the town in 1825, and the capital was moved to Montgomery. And that's how it's been. Since those early days, floods have altered the history of Alabama.

But the situation is changing. Today, projects to help reduce flooding and conserve resources are having a lasting and beneficial effect on the state. The Watershed Protection and Flood Prevention Act (Public Law 566, as amended) is bringing to people in flood-prone areas not only protection from floods but also opportunities for community growth and improvement.

The city of Heflin, for example, is moving to take full advantage of its PL-566 multipurpose watershed lake. The 84-acre impoundment at the edge of the city provides 637-acre feet of municipal water. Escar Wood, mayor pro tem and city council member, said that everything except the filtration plant is ready. Heflin officials are waiting approval from the Department of Housing and Urban Development of a grant to share the cost of completing the plant.

"The lake will supply all the water we expect to need," Wood said, "so we hope to bring in more industry. We missed out several times in the past because we could not promise new industries the water they needed. We

A 23-acre watershed lake on Hurricane Creek, near Bluffton, Alabama.

could not even allow existing plants to expand. We have been using drilled wells and pumping everything we can pump. The water table has been dropping and our wells are gradually failing."

Before it was improved, High Pine Creek in Randolph County was clogged with silt and debris, and it flooded three to five times every year. People were leaving Roanoke and the surrounding area in droves. Those that stayed were left to search for solutions to the area's resource problems.

Use of land along the meandering stream was severely restricted. Sediment in Roanoke's water-supply reservoir had reduced its capacity by one-third in 7 years; water rationing was normal during dry seasons. The sediment interfered seriously with water purification.

Today, 209 surface-acres of water are stored in nine flood detention reservoirs. Water rationing is no longer needed in Roanoke, and fishing and water sports are popular again in the area. The reservoirs were designed to catch and store 836 acre-feet of sediment during the next 50 years without impairing their effectiveness.

"Our town has made steady progress since our water supply reservoir was completed in 1961," said J. C. Phillips, mayor of Roanoke. "We have extended the city limits and added new water and gas lines for residential and industrial use. Naturally, we attribute this growth and development to our dependable water supply." The 51,000-acre High Pine Creek Watershed Project that brought this about was completed in 1966.

A multipurpose lake in the Choccolocco Creek watershed. It helps prevent flooding and stores the water supply of Anniston, Alabama.

The Choccolocco Creek Watershed Project near Anniston is another example of multiple use of floodwater retarding structures. Two reservoirs help prevent flooding and store the water supply of Anniston and Oxford.

A multipurpose structure in the Talladega National Forest has water stored for recreational use. There, people can enjoy fishing, camping, boating, water skiing, and other sports in the quiet atmosphere of a secluded spot in the mountains.

A multiple-purpose dam planned for the Cypress Creek watershed will provide recreation areas for Florence State University. This impoundment will cover 71 surface-acres and will contain 280 acre-feet of water.

Small watershed projects have brought 95 flood detention dams to Alabama. Seven of these impoundments also store water for municipal and industrial use, three for irrigation, and two for recreation.

Alabama has a rich heritage, beautiful scenery, and one of the country's most unspoiled environments. The framework of locally sponsored watershed projects offers many ways to improve these values as well as the economy. ♦

Grass is right on rights-of-way

In West Virginia, new transmission line rights-of-way receive what is virtually a landscaping treatment in a program devised jointly by the Soil Conservation Service and the Monongahela Power Company.

When the Monongahela Power Company constructed a new 500,000-volt line from Fort Martin to Mount Storm, it saw the need to protect the land from erosion and the lines from tree limbs.

The company asked the Monongahela Soil Conservation District for technical assistance in revegetating and stabilizing the land disturbed by construction equipment under the towers and the miles of powerline. A plan was prepared that included diversion ditches and water control devices to protect against erosion from runoff water.

The Monongahela Soil Conservation District worked on a number of springs under the newly constructed line so that all the water from the springs was piped into water troughs. This not only kept the water free from silt but also provided fresh water for livestock, wildlife, and other uses.

When Monongahela Power started construction on another line between Clarksburg and Weirton, company officials again consulted with SCS. This new line was scheduled to transverse the Upper Buffalo Creek watershed, where a flood prevention project is underway. Previous experience indicated that simple erosion control practices, such as diversion ditches followed by seeding of bare soil, would minimize erosion and prevent sedimentation of streams.

Curt Foreback, a forester with Monongahela Power, knew the importance of controlling erosion near the 12 flood prevention dams in the watershed. With the help of SCS and the Monongahela Conservation District, he drew up a plan for revegetating the disturbed areas. The plan was written into the contract for building the line, and the contractor is now implementing the requirements. Monongahela Power officials hope to use this same method in future line projects.

After a total plan of revegetation was written, the first step was to prepare a seedbed. Next, lime and fertilizer were applied in amounts determined by soil tests. Then the land was seeded by a tractor-drawn cyclone-type seeder. Within a year, the area should be ready for use as pastureland or as a home for wildlife.

To make lines readily accessible for quick repair, the company maintains a low-growing cover of shrubs, forbs, and grass on its rights-of-way.

In addition to controlling erosion, the low-growing shrubs and grass provide excellent food and cover for birds and other wildlife.

James S. Bennett, the SCS state conservationist in West Virginia, believes that this joint effort between the Soil Conservation Service and Monongahela Power Company "is proving time after time to be a sound investment in natural resources management as well as a solution to many maintenance problems." ♦

Tall fescue is replacing a temporary cover of rye on this right-of-way in Taylor County, West Virginia.

by O. L. Helmick
District conservationist, SCS
Morgantown, West Virginia

Terraces no problem

by John M. Cross
Public information specialist, SCS
Lincoln, Nebraska

Ralph and Harry Wilson, a father-son team, vote in favor of terraces on center pivot irrigated fields. They have them, they like them, and the terraces do a lot of things for their farm in Clay County, Nebraska.

"The land wouldn't be worth much without the terraces," Harry claims.

The Wilsons have two center pivot irrigation systems. One is a $14,000, 13-tower rig that waters 135 acres in a 2½-day cycle. Wheels must cross and recross 6,480 feet of terraces protected by good grass and two grassed waterways. Corn rows follow the terraces.

The other system is used on a quarter section almost too level to need terraces, although the Wilsons are considering putting in a couple on a sloping side.

"Any problems with tower wheels crossing the terrace ridges," we asked. "None at all," Harry replied. "A little water collects in the wheel track in the channel of the terrace but causes no problem. If it rains during the irrigation season, the terraces ease the water onto the grassed waterways and out of the field."

In the 135-acre irrigated circle there are 115 acres of corn, about 8 acres of grass on the terraces and waterways, and more than 7 acres of grass around a pond. "We don't have any wasted land within the sweep of the system," Wilson assured us. The silt loam soil has a good infiltration rate.

The terraces were built in 1959 before the Wilsons acquired the farm. A well and an old pivot system were installed in 1963. An old rig had been in operation since 1948 and had to be replaced. But even the old rig crossed the terraces without trouble.

The terraces and waterways do much more than help control runoff. They feed cattle.

The Wilsons buy 500 calves each September and turn them into the field after harvest. The calves have 23 acres of good grass plus 115 acres of corn stalks—instant feed. From the field they go into the feedlot. "Cattle seem to gain better when they've been on the grass and stalks first," explained Harry. It would be hard to put a dollar figure on the value of the forage, but he knows it is significant, mainly because of the amount of feed saved.

Water for the cattle is provided by a 2½-acre pond in a corner of the field. Should there be any tailwater from irrigation, which isn't likely, the pond catches it as well as runoff from rain and snow.

More ducks nested near the pond last year than ever before. Pheasants are plentiful there, and deer come around a couple of times a year.

But if a man didn't have terraces on an irrigated field, would he build them? Kenneth Keasling from Harvard, Nebraska, provided the answer. He was in his third year of operating a center pivot system on 117 acres, 35 of which were "pretty rough," when he decided to terrace. "I was willing to try them," he said.

He had a washout in a draw through the field in which the end tower would get stuck. He had tried dikes in another field to solve the same problem, and they caused a gully.

George Remmenga, a Soil Conservation Service district conservationist, figured Keasling needed about 8,000 feet of terraces. Keasling is a participant in the Great Plains Conservation Program, which makes him eligible for cost sharing. This helped him with about 5½¢ a foot on the terrace construction. Keasling wants to save his land, whether an irrigation rig has to cross terraces or not.

Those who have terraces and a center pivot irrigation system like them; many who don't have the terraces want them. Remmenga is asked a lot of questions about terraces by farmers cooperating with the Upper Big Blue and Little Blue Natural Resources Districts, where he is assigned. He lets men like Harry Wilson, who have experience with terraces, help him answer the questions. ♦

Grassed terraces and a center pivot irrigation system have proved to be a good combination on this farm in Clay County, Nebraska. Cattle graze the fields after the corn is harvested.

The center of rural excellence

by Gene Warren
Public information specialist, SCS
Alexandria, Louisiana

The people of LaSalle Parish, Louisiana, are winners. The U.S. Department of Agriculture selected the LaSalle Parish Rural Development (RD) Committee as tops in the nation in 1972 and gave it the Department's Distinguished Service Award.

"When you get right down to it, the main objective of our RD Committee is to make this parish a better place in which to live and work," is the way Committee Chairman H. D. Gaddis put it.

A group of hard working, fast thinking people have just about accomplished that objective. More than 1,500 new jobs have been created during the past few years as a result of several new industries coming into the parish. And at a time when most rural parishes are losing people, LaSalle Parish's population increased by nearly 1,000 during the past year. "Young people want to stay, and new people keep coming here because there are jobs and the area is healthy and beautiful," Gaddis said.

The Rural Development Committee is made up of representatives from the Louisiana Cooperative Extension Service, the Soil Conservation Service, the Agricultural Stabilization and Conservation Service, the Farmers Home Administration, and the Louisiana Forestry Commission. But the committee gives much credit to its subcommittees on tourism and recreation, health and housing, industrial development, and agriculture and forestry.

Action projects that helped the committee win top honors are numerous and impressive. One such project several years ago helped establish a feeder-pig program which brought a new source of farm income. "Local people got behind this project from the beginning," Gaddis said. "Our peak year brought $1,000,000 in sales from pigs in LaSalle and the four adjoining parishes. Most of the farmers who sell pigs here need to supplement their incomes. About 350 farmers sell at the monthly auctions."

As an outcome of the feeder-pig project, a feed mill was built that in turn led to the development of an industrial park. Townspeople raised more than $50,000 to buy the park site. The park has already attracted several industries employing more than 600 people. A shopping center is to be built there soon.

The RD Committee was instrumental in bringing in the new plywood mill at Urania and the garment plant in Olla, which together employ more than 800 parish people.

"As long as they have a place to work, rural people living on small farms will stay in the community," said Fred Shiel, secretary of the LaSalle Development Board, which works with the Rural Development Committee in creating attractive working conditions.

The committee also helped set up the new farmers market at Jena where farmers sell their produce twice a week.

It assisted in forming a sewage district which serves 3,000 parish people, and seven rural water districts. Eventually, more than 1,700 rural families will benefit from new water-supply systems.

The committee has helped nine schools in the parish with erosion control measures. Cooperating with the LaSalle Soil and Water Conservation District, the committee assisted each school in developing a conservation plan that led to shaping and seeding of the grounds. "Much of the work was done by the police jury and other local people," said Tommy Biles, the SCS district conservationist at Jena. "The students also helped, and several schools developed outdoor classrooms for teaching conservation."

LaSalle Parish has only 13,000 people, but the subcommittee on tourism and recreation has big-city ideas. "Soon we will have an amphitheater here in Jena, and we expect to draw people to theater productions from all over the state," said Mrs. Mary Ann Sleeth, chairwoman of the committee. The theater was funded

by a state grant and local money.

The committee has also promoted the Catahoula Lake Development area and the creation of a wildlife refuge to attract waterfowl. It helped spark the civic pride that led to a parish vote for taxes to build a center to hold the parish fair, rodeos, senior citizen activities, music programs, and other events.

People everywhere in LaSalle Parish are talking about the good things happening there in central Louisiana. A lot of credit, they say, goes to the RD Committee and those who helped put progressive programs into action. ♦

The industrial plant in the background is one of several that the LaSalle Parish Rural Development Committee helped bring to the parish. In the foreground, left to right, are Tommy Biles, SCS district conservationist at Jena, Louisiana; Fred Shiel, secretary of the LaSalle Development Board; and H. D. Gaddis, chairman of the Rural Development Committee.

A look at the United States —from space

by Vincent J. Price
Information Division, SCS
Washington, D.C.

The first "satellite" maps of the United States are being made by the Soil Conservation Service's Cartographic Unit in Hyattsville, Maryland.

The maps, technically called mosaics, are based on images received from a satellite, but the land is not obscured by cloud cover and the mosaics conform to a standard map projection. Mosaics of much of the country are already on sale to the public.

The images for the mosaics come from the National Aeronautics and Space Administration's Earth Resources Technology Satellite (ERTS) Program. ERTS-1 was put into orbit on July 23, 1972. Scanning devices within the satellite immediately began measuring reflectance and radiation from the land 565 miles below. The data are transmitted to ground receiving stations and converted to photograph-like images that can be rectified and joined into mosaics.

NASA contracted with SCS to produce mosaics of the United States by combining into one picture the 700 individual scenes that ERTS-1 scanned of the 48 contiguous states. That, however, is easier said than done. Two main problems confronted the SCS cartographers.

First, cloud cover and atmospheric haze usually obscure most of the land below. Second, the ERTS images, because they are precise, do not conform to essential distortions of map projections. Unless the images are either printed on a surface that conforms to the curvature of the earth or corrected to counter the distortion, many of the ERTS images cannot be mounted together with precise matching of imagery throughout the assemblage.

Because of its soil survey program, SCS has long experience in making mosaics from aerial photographs. But to mosaic the ERTS images,

Ralph M. Hooper, an SCS cartographer, looks over the West Coast as it appears on a 1:1,000,000-scale mosaic of the United States.

a new system had to be developed. "We really had to get away from the conventional concepts of making mosaics to do this compilation," explained Ralph M. Hooper, the SCS cartographer who developed the ERTS mosaic system.

ERTS-1 imagery is scanned in 110-mile-wide strips. Every 18 days, the satellite completes an orbit and begins to scan the same scenes. Thus, with several images of the same scene to choose from, SCS is able to eliminate the parts obscured by cloud cover and atmospheric haze and substitute clear images. The result is a 99 percent cloud-free view of the country.

That left the problem of distortion. To prevent a major loss of precision in transferring the images onto a flat surface, the cartographers adjusted the scenes to fit a standard map projection, the Albers Equal-Area Projection. Two standard parallels were taken at 45°30′ and 29°30′. At these two parallels the proportions were kept perfect. Between the two parallels the east-west dimensions of each scene were decreased and the north-south dimensions were increased. North of 45°30′ and south of 29°30′ the opposite was done—the height of each scene was lessened and the width inversely magnified.

The resulting proportions, when printed on a flat surface and mounted according to detailed procedures, give a map of great accuracy. An estimated 90 percent of the features shown are within a few hundredths of an inch from their true position—and this on a mosaic that is 10 feet by 20 feet!

SCS is making four different mosaics of the 48 contiguous states. The scanning devices in ERTS-1 are sensitive to different bands of the spectrum—green, red, near infrared, and infrared. SCS is making two mosaics from red spectrum imagery and two from infrared—one in each band from scenes scanned during the summer and one in each from winter imagery.

The red band is sensitive to green plants. The infrared band is sensitive to heat reflection; because water absorbs heat and land reflects it, the infrared band imagery gives very distinct contrasts between land and water.

The mosaics show mountains, lakes, reservoirs, rivers, major streams, and geologic formations such as faults and escarpments. Vegetation and the lack of it—forests, deserts, cropland—show up more clearly on the red band mosaics. Water areas and drainage patterns are clearer on the mosaics made from the infrared imagery.

All four mosaics are black-and-white and could easily be mistaken for photographs.

SCS is reproducing the mosaics in seven scales. A mosaic at the 1:5,000,000 scale comes in 6 sheets. Mosaics at the 1:1,000,000 scale come in either 17 or 54 sheets. Other mosaics are made from enlargements of these two scales.

All of the summer imagery mosaics will be available by April 1974. Mosaics of all but the easternmost parts of the United States are already available. For information about the mosaics, write to Cartographic Division, Soil Conservation Service, Federal Center Building No. 1, Hyattsville, Maryland. 20782.

"It's fascinating work," reported Ralph Hooper. "As each panel is put in place, we can see the United States unfolding. And we're the first to see it, which is exciting. Others have seen it piecemeal, but we're getting the whole picture." ♦

Improved channel improves a neighborhood

by Terry E. Smith
Project construction engineer, SCS
Victoria, Texas

Forty families in Port Lavaca, Texas, wanted a natural channel running through their backyards improved, but they also wanted their backyards left intact, with trees, shrubbery, fences, and other improvements.

With that thought in mind, Soil Conservation Service engineers set out to plan the Chocolate, Little Chocolate, and Lynn Bayou Channel Improvement Project. The project area is in south central Calhoun County; the work is sponsored by the Calhoun County Drainage District No. 11.

Lynn Bayou, in its natural state, meandered somewhat through the 40 backyards, adding much to the beauty of the landscape. Because of this, very little realinement was made in the improvement work.

This concrete drop structure lowers water from one level to another without causing erosion and prevents encroachment of salt water from Lavaca Bay into the channel.

Front-end loaders were used for excavation so that the spoil could be spread under trees and utility lines along the channel. Side slopes were constructed smooth, and the excavated earth was blended into the sloping yards. When the grass is established, it will be possible to mow most of the channel slopes with a lawn mower.

Extreme care was exercised by the construction crew to protect all large trees outside the excavated area. Brush that was removed and all trash were hauled out of town for disposal.

A concrete drop structure was constructed in the improved channel at the point where fresh water from the watershed meets sea water from Lavaca Bay. This structure prevents encroachment of the sea water into the improved channel. White rock riprap was used to stabilize the banks near the drop structure. When construction was finished the entire area was seeded to grass.

The people in the channel improvement area feel that the SCS project improved not only their backyard bayou but also the entire neighborhood. ♦

Soils tour

by Christopher Williams
District conservationist, SCS
Phoenix, Arizona

"I was surprised to discover how much soils can vary in the short distance of 20 miles," said an environmental planner for the city of Phoenix on a "soils tour" of central Maricopa County, Arizona.

The purpose of the tour was to make urban and environmental planners and engineers more aware of the many uses of soils data.

The tour was conducted by Soil Conservation Service people from three field offices and sponsored by a local natural resource conservation district. A team composed of a soil conservationist, soil scientist, engineer, and district conservationist gave the participants a rundown on all aspects of soils, soil surveys, and the use of interpretive maps and tables.

Bussed from one site to another, the participants dug holes with an auger and observed, compared, and discussed handfuls of soil.

At one stop, where a soil profile was exposed, two volunteers were asked to try to delineate the horizons of a soil profile by plugging sticks at the approximate dividing lines. They soon learned that it takes a knowledge of soils, as well as a trained eye, to accurately delineate horizons.

Delineating the horizons of a soil profile by plugging sticks at the approximate dividing lines.

Participants on an SCS "soils tour" examine handfuls of soil.

Shovels were passed out at one of the stops, and some of the participants began digging at a preselected site on cropland. A few feet down they struck a caliche hardpan, which gave opportunity to discuss the limitations of the site for buildings and septic tanks.

Another soils tour is being planned. This time realtors will be invited. ♦

Terraces for flood control

by Bruce Kidman
Civil engineer, SCS
Santa Fe, New Mexico

In 1970, Aztec, New Mexico, had finally had it up to its "first-story windows" with flood problems.

Large floods had occurred in 1932, 1938, 1941, 1954, and 1965. The 1965 flood caused about $30,500 in damages in this city of 3,700 people. The big floods were bad enough, but smaller, more frequent floods occurred almost every year.

The city had asked the Soil Conservation Service for help under the small watershed protection program, but the waiting list for help was long. The SCS area office was able to provide planning assistance, but there was still no financial assistance. Then

These flood control terraces above Aztec, New Mexico, were built to contain runoff from a 100-year-frequency storm.

a commitment for partial funding of a pilot watershed project came from the Four Corner's Regional Commission (FCRC), which is set up to distribute federal grant-in-aid funds in economic development regions.

An engineer, hydrologist, range conservationist, biologist, and economist from the SCS area staff and a geologist from the SCS state office made up the planning team that was charged with producing an abbreviated plan within 30 days.

Four alternatives were presented to the city. These consisted of single elements and combinations of floodwater retarding structures, flood control terraces, and a floodwater diversion plus conservation treatment of the entire drainage area.

One floodwater retarding structure, 7,000 feet of terraces, and supplemental land treatment measures were selected as the best plan for reducing flood damages.

FCRC put up $22,000 to build the terraces, which were completed in the spring of 1972.

The terraces, with a capacity to contain runoff from a 100-year-frequency storm, were built on approximately 108 acres of the 654-acre drainage area. Normally considered a soil conservation measure, these oversize terraces are a major structural component for flood prevention in this watershed. Their effectiveness was proved in the fall of 1972 when a severe thunderstorm hit the community. They prevented an estimated $50,000 in damages from floodwater runoff.

The slope of the land on which the terraces were built ranged from 4 percent to 20 percent. A typical terrace cross section is 30 feet wide at the flat channel bottom, has 2:1 side slopes on the dike, a 10-foot top width on the dike, and is 2 feet from channel bottom to the crest of the emergency spillway.

A 100-year-frequency storm will pond water in the terraces with no discharge. The water will dissipate through seepage and evaporation. Testing of the soils prior to design indicated rapid infiltration.

Most of the upper drainage area is rangeland with sparse vegetation, steep slopes, and much gully erosion. A land treatment program is planned which includes 4 miles of fencing to help control grazing and indiscriminate vehicular traffic; 113 small grade control structures; control of competitive shrubs; 42,000 feet of range furrowing; and 100 acres of seeding.

One might suppose that an average annual rainfall of 8.5 inches wouldn't do much more than settle the dust occasionally. But when the rain comes in high intensity, short duration storms and falls on steep, unprotected slopes, the flood and sediment problems are just as real as anywhere else. Houses, commercial and institutional buildings, roads, and irrigation canals on the 209-acre flood plain are all subject to flood damage.

Water is short in New Mexico and a wary eye is kept on its use by the New Mexico State Engineer. He determined that a water right of 2.3 acre-feet per year would have to be satisfied on this project. The city of Aztec has obtained this water right.

Plans for the future call for obtaining funds to complete the land treatment program and the floodwater retarding structure that will control runoff from 468 acres. In the meantime, the terraces are performing very well. They have paid for themselves several times over already. It must be stressed, however, that complete effectiveness will not be obtained until all planned components of the system on the entire watershed have been installed.

One local unit of government, one state agency, and two federal agencies moved in a cooperative, coordinated effort and got this project underway—and before the next flood season came around. ♦

New hope for New Lexington

by George L. Schmelzer
District conservationist, SCS
Somerset, Ohio

A large earthen dam is being built across a broad valley just north of New Lexington, Ohio. Hope for future community development and prosperity for the village's 5,000 people grows with the dam.

In June 1950, houses and businesses in the flood-prone area suffered $63,000 in damages. Periodic flooding alternating with severe water shortages has emphasized the need for the dam.

"Our existing reservoir is just not adequate," remarked Paul Shumaker, the village administrator. "Increasing water demands made our situation worse each year."

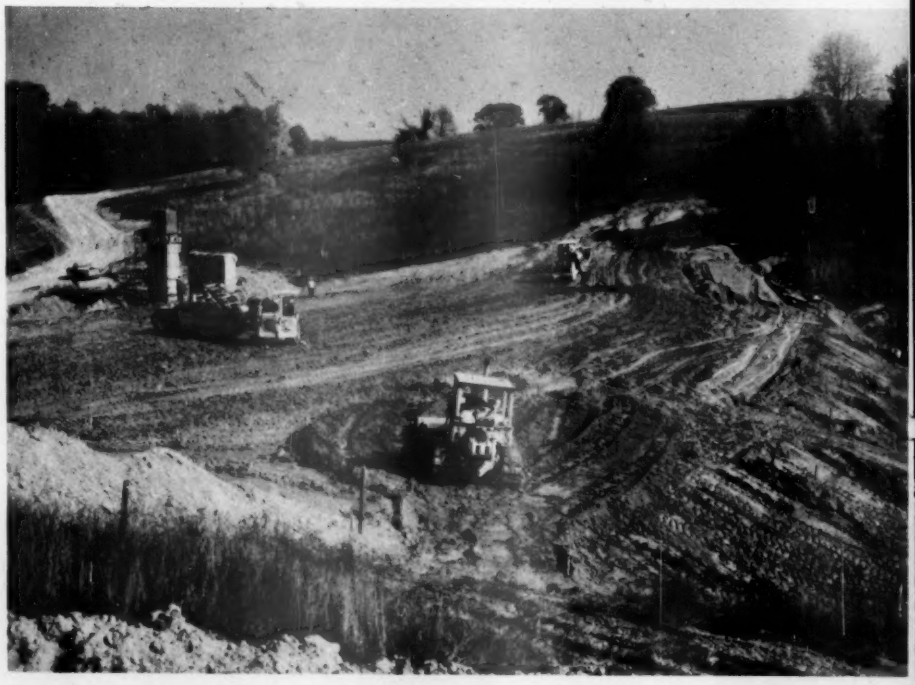
"Possible new industry has been lost to this area because of the water shortage," said Mell G. Underwood, Jr., the special council for the village. "Some of our existing industries threatened to leave if something was not done."

In 1971, the water shortage became critical. All carwashes were closed, and people were asked to use as little water as possible. No new hookups to the water system were allowed. Because of the no-hookup rule, the new high school could not open until water was available.

Back in 1958 the community had applied for federal assistance. The Soil Conservation Service made an investigation of possible dam sites for flood protection and water supply. Other aspects of the proposed project were checked to determine if the project was feasible under Public Law 566—the Watershed Protection and Flood Prevention Act.

SCS prepared a complete work plan for the Rushcreek Water-

A serene valley near New Lexington, Ohio, is being changed by men and machines. The watershed dam under construction will provide flood protection and water supply for the village's 5,000 residents.



shed Project, detailing construction features, costs, and benefits. And it made funds available for the flood prevention measures of the project.

Chances of the project becoming a reality looked good, but financing to supplement the funds provided by SCS had to be found. Also, a serious pollution problem above the reservoir had to be solved.

The pollution problem eventually was taken care of through the cooperation of local and state agencies. The financing took a little longer—until the Economic Development Administration (U.S. Department of Commerce) provided a grant toward the project. Then the Farmers Home Administration (U.S. Department of Agriculture) came through with the rest of the money by making a long-term loan to the village.

In 1972, above-normal rainfall provided plenty of water to the community, but the villagers remembering critical shortages in the past continued to push for the long-awaited dam until all signals were "go."

Contracts were let in the fall of 1972, and construction began in the spring of 1973. If the weather permits, construction can be completed by the end of 1973. It will be some time yet before the dam is full of water, but for the people of New Lexington the future looks bright already.

Their new 44-acre lake will have a capacity of 163 million gallons. The water will be piped to the existing treatment plant, which can adequately treat the water from both the new and old reservoirs. "The new water supply impoundment will eliminate our water shortages for the foreseeable future," said Underwood.

The Rushcreek Watershed Dam, meeting the needs of the community, will allow the people of New Lexington to plan for future growth. ♦

Sanitary landfills on the rise

by Frank Jeter, Jr.
Public information officer, SCS
Raleigh, North Carolina

As an alternative to open dumps, many of which are being closed in light of antipollution action, sanitary landfills are fast becoming the most popular method of solid waste disposal.

In North Carolina, a survey by the Soil Conservation Service showed that 180 landfills, either still in use or already filled, are located in the state's 100 counties. And 79 landfills are in the planning stage.

Of the 180 landfills, SCS—working through soil and water conservation districts—assisted with 88. In the 79 planned landfills, SCS assistance was requested for almost every one.

SCS can help units of local government, whether county or municipal, in landfill site selection. Its data and technical assistance can help insure that surface and underground pollution of soil and water will not occur in the disposal area.

"We know that some of the older landfills, perhaps started years ago, don't quite live up to the definition of 'sanitary landfill,' " commented Jesse Hicks, the SCS state conservationist in North Carolina, "but quality evidently is getting better as use of this method of waste disposal increases."

Hicks explained that not every available tract of land is suitable for use as a landfill. Underground water movement or unfavorable soil characteristics may make a site unsuitable.

A sandy loam or similar soil is best. Dense clayey soils or water saturated soils can pose problems, and an area with heavy deposits of stone may be impossible to work or digging operations there may be very costly.

Most sanitary landfills consist of a large trench where refuse is deposited then compressed with heavy machinery. Each day's waste is covered with a layer of soil. When the trench is completely filled, it is sealed with a heavier layer of soil, covered with available topsoil, and planted in grass or other protective vegetation.

SCS assistance generally includes onsite inspection of the area under consideration or a detailed soil survey of the landfill site. Often resource inventory and evaluation reports provide useful data to municipal or county officials who have the responsibility for selecting a site.

All these services have been provided by SCS in every part of North Carolina during recent years, and the trend is expected to increase as landfill use expands.

"Often we find a cooperative effort on the local level," Hicks said. "We have counties operating landfills that are also utilized by a city, and the other way around. Health departments often cooperate. We of course are glad to provide SCS expertise to all units of government." ♦

Willing to learn and willing to do

by Edgar F. Baumann
District conservationist, SCS
Pendleton, Oregon

Leg work, head work, and just plain hard work. This pretty well sums up the year's activities of the Southern Umatilla Soil Conservation District's Junior Board.

Determined to bring young people in this eastern Oregon wheat-growing area into its programs, the Southern Umatilla Soil Conservation District appointed its first junior board in 1972.

That year the junior board worked mainly in promoting environmental education activities in the area. Four junior board members acted as counselors at the Outdoor Education School and distributed conservation literature to sixth graders there.

Building on this first-hand experience with the educational process and realizing that much more than training sixth graders was needed if their community was to increase in environmental awareness, the junior board formed a program of action that would hit several areas of environmental needs.

The 1973 plans included getting involved in Pendleton's long-range beautification program for the Umatilla River, which flows through the city. The board members planned two ecology poster contests for local schools—one for grades 5 and 6, the other for grades 3 and 4. Last spring, during Soil Stewardship Week, they delivered soil stewardship materials to local churches.

The junior board contacted the County Superintendent of Schools about placing a series of environmental teaching guides in schools. These are the guides provided by the National Council of Garden Clubs and the Women's Auxiliary of the National Association of Conservation Districts.

Not content to be planners and coordinators, the junior board asked for and received training in packaging and planting the kinds of shrubs used in windbreaks, which are much needed in this windy country.

Hoping for some help to multiply their efforts, junior board members have asked local schools to select 10 students with an aptitude for the outdoors to accompany Pendleton outdoor education teachers on visits to other Oregon schools where outdoor education is a regular part of the curriculum. This cadre of "experts" could then be called upon to help establish outdoor learning areas on school sites throughout the county. They could also be used as teaching assistants at outdoor learning areas.

To help the junior board members see the big picture of community conservation needs, the senior board has taken them about the county for a first-hand look at conservation practices.

Ed Hoeft, chairman of the Southern Umatilla Soil Conservation District, is convinced that the junior board is adding a new dimension to district activities and proving to be a valuable resource in itself. ♦

C. J. Gilbert, vice chairman of the board of the Southern Umatilla Soil Conservation District, points out some of the conservation practices on his farm to three members of the conservation district's junior board (from left to right) Becky Kuiken, Ann Lorenzen, and Patty Jo Fields. Tom Warren, SCS state forester, stands in the background.

Statement on land-use policy

The following is excerpted from the Secretary of Agriculture's memorandum 1827, issued on October 26, 1973.

Purpose. The Department (of Agriculture) recognizes that major responsibility for land-use policy (planning and regulation) rests with local and state governments. The Department also recognizes the rights and responsibilities of landowners and users in making land-use decisions within this framework. Fifty-eight percent of America's land is in private hands, 75 percent held by farmers and ranchers. Another 8 percent in National Forests and National Grasslands is managed by the Department, while 6 percent is owned by state or local governments. Through its agencies the Department administers some 80 programs that influence private as well as governmental landholders' land-use decisions—urban as well as rural. This memorandum establishes Departmental policies to help assure sound public policy to maintain and improve the nation's natural resources.

Policy. The Department will:

Adapt present pertinent programs to help enhance and preserve prime agricultural, range, and forest lands for those uses.

Promote and help influence the management of rural lands to assure adequate sources of high-quality water.

Intensify establishment of permanent soil and water conservation on the erosion-vulnerable lands returned to cultivation to help increase production of crops and livestock.

Expand the Department's efforts to assure wider understanding of how its programs and responsibilities contribute to improved land uses.

Cooperate fully with other Departments in terms of responsibility for policy and leadership.

Further coordinate the work of the Department's agencies at the state level to make all its land-use efforts relevant and harmonious.

Provide timely information and assistance including non-farm interpretations of soil surveys, small watershed hydrologic data, and economic information to local, county, and state land-use decision makers.

Strengthen and expand the Department's capabilities in harmony with others for surveying and monitoring land and related natural resources and to provide resource condition evaluations to local, county, state, and federal governmental land-use decision makers.

Help protect rare and endangered plant and animal species and their ecological systems as well as historic, cultural, scientific, and natural systems.

Help conserve and develop significant waterfowl habitat lands.

Assist in the reclamation of land surfaces used for the extraction of non-renewable resources such as coal, minerals, oil, and gas.

Work with other agencies to discharge fully the responsibilities authorized and directed to the proposed Interagency Advisory Board on Land-Use Policy.

Land inventorying and monitoring. In providing additional resource information to local and state governments the Department will expand at the earliest feasible time its surveys and studies to include:

A nationally recognized system of land classification.

County, state, regional, and national inventories of available soil, water, and related resources and projections as to land-use potentials.

Guidelines to identify critical environmental

problems to be considered in state and local land-use policy planning.

Physical, social, economic, and institutional information for evaluating national policy questions concerning agricultural, forestry, and other rural land uses. Also analyses of factors producing land-use changes.

Identification, location, and productivity ratings of farm, range, and forest land.

Research on emerging issues concerning land resource and water use, supplies, and requirements. In so doing take into account alternative environmental, institutional, and demographic factors and both short- and long-term national and international needs.

Program emphasis. Department agencies will direct their programs to the extent possible—including redefinition or modification of their policies—to:

Increase production of detailed soil surveys.

Establish land-capability criteria to help direct the flow of urbanization to land areas least suited to crops and forests.

Help guide urban growth to preserve prime farm lands, minimize fragmentation of land holdings, provide adequate water supplies, equalize taxes, dispose waste properly, and provide adequate public health, recreation, and safety services.

Plan and guide effectively land use in the rural-urban fringe areas and in recreation or second-home subdivisions.

Control erosion and reduce sedimentation.

Minimize the impact of surface mining on rural land uses.

Locate sites for solid waste disposal as an increasingly important land use.

Give attention to need for small watershed, flood plain, wetlands, and coastal zone management programs based on comprehensive land-use planning incorporating ecological considerations.

Encourage multiple-use management of forest lands to assure a continuous supply of forest goods and services with environmental objectives.

Manage farm, ranch, and forest practices to minimize adverse effects on the environment.

Implementation guidelines. The Department and its agencies will be guided by the following purposes in policy implementation:

(1) To conduct programs within state and federal environmental standards.

(2) To conserve and improve land and related resources.

(3) To enhance the amenities and social assets of rural America.

(4) To seek fair returns for farms, forests, and ranches as economic units.

(5) To support research and education on land-use planning.

(6) To promote economic development in the rural areas.

(7) To assist all citizens and agencies to obtain technical data needed for planning.

(8) To continue to act in concert with federal, state, multijurisdictional planning and development agencies and local agencies. Also with quasi-public and private organizations and individual landowners and operators.

Review

Books

Environmental Geomorphology and Landscape Conservation. Vol. 1: Prior to 1900. Edited by Donald R. Coates. 1972. *State University of New York at Binghamton. Dowden, Hutchinson & Ross, Inc., 523 Sarah Street, Stroudsburg, Pa. 18360. (Distributor outside the United States and Canada: John Wiley & Sons, Inc.)*

The interaction of man and nature, and the unwitting or uncaring disregard of natural values sometimes exhibited by man is a subject of increasing concern and study. As Dr. Coates states in his introduction to this volume, man has acted on, with, and against his environment during his entire tenure of earth.

The Benchmark Series, of which this volume is a part, represents a collection and republication of papers relevant to the subject—the relationship of man and his environment. The 33 articles in this volume constitute some of the best early literature available on man's involvement with surface features of the earth. For many readers of SOIL CONSERVATION, several of these writings would largely be inaccessible were it not for this volume.

The general subject of environmental geomorphology is defined by the editor to include (1) study of geomorphic processes and terrain that affect man, including hazard phenomena such as floods and landslides; (2) analysis of problems when man plans to disturb or has already degraded the land-water ecosystem; (3) man's utilization of geogmorphic agents or products as resources, such as water or sand or gravel; and (4) how the science of geomorphology can be used in environmental planning and management. Landscape conservation is defined as constructive attempts by man to live more harmoniously with his environment, often by helping nature to help itself.

The early awakening of man's insight into environmental problems and values is described in the articles, which were either written before 1900 or document conditions before that date.

Included are some glowing reports of the fairness of the new land in America. Robert Beverly of England in 1722, for example, stated, "The soil is of such variety, according the difference of situation, that one part or other of it seems fitted to every sort of plant that is requisite either for the benefit or pleasure of mankind."

Also included is an excerpt from what the editor describes as the first comprehensive book on the impact of man on nature, "The Earth as Modified by Human Action," by George Perkins Marsh, published in 1877.

Two articles discuss reasons for the fall of the Roman Empire. Three articles argue that major climatic changes, and not mismanagement of land resources, were the main causes of the disappearance of advanced cultures.

The oldest discussion of early environmental problems is provided in the translation of selected writings from about 60 A.D. by L. Junius

Meetings

December

2–5 National Conference on Access to Recreational Waters, Fort Lauderdale, Florida
2–6 National League of Cities, San Juan, Puerto Rico
2–8 National Association of Manufacturers, New York, N.Y.
5–6 Twentieth Annual Meeting of Keep America Beautiful, Inc., New York, N.Y.
5–7 Western Forestry and Conservation Association, San Jose, Calif.
11–14 American Society of Agricultural Engineers, Chicago, Ill.

January

14–17 North American Game Breeders and Shooting Preserve Association, Inc., Sacramento, Calif.
16–17 National Council of Farmer Cooperatives, Washington, D.C.
17–19 American Farm Bureau Federation, Atlantic City, N.J.
18–23 American National Cattlemen's Association, San Diego, Calif.
20–24 National Association of Home Builders, Houston, Texas
23–26 National Woolgrowers Association, San Diego, Calif.
31–Feb. 2 Sixth Annual Catfish Farmers of American Convention and Trade Show, Memphis, Tenn.

February

2–3 Society for Range Management, Tucson, Arizona
10–14 National Association of Conservation Districts, Houston, Texas
20–22 Land Improvement Contractors of America, Williamsburg, Va.
20–23 American Camping Association, Atlanta, Georgia
21–22 Southern Forest Institute, Atlanta, Georgia
25–Mar. 2 American Association for the Advancement of Science, San Francisco, Calif.

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Columella, the Roman author of at least 16 books on husbandry. Columella refutes the theory prevalent in his time that soils go through an irreversible aging process during man's use of them; he describes how fertility can be maintained. Columella discusses also the evils of city life and the degenerate nature of Roman society and gives his postulation that husbandmen—farmers—are the essential or ultimate bulwark of strength in the society.

Articles by authors well known to many readers of this magazine include "Lessons from the Old World to the Americas in Land Use," by Walter C. Lowdermilk, and two articles on ancient and modern use of soils by Gerald W. Olson of Cornell University.—**Donald E. McCormack, *Assistant Director, Soil Survey Interpretations Division, SCS, Washington, D.C.***

New publications

Wastewater treatment technology. Second Edition. *1973. Illinois Institute for Environmental Quality, (Chicago). 370 pp. $9.00.* Gives information on existing methods of treatment, levels of treatment attainable, and associated costs for materials found in industrial wastes —arsenic, barium, boron, chloride, copper, cyanide, and others.

Water Pollution Economic and Planning Models. A Bibliography with Abstracts. *1973. National Technical Information Service (P.O. Box 1553, Springfield, Va.). 54 pp. $20.* Fifty-one selected abstracts of research in the areas of pricing policies, urban planning, water resource management, and control techniques.

Preventing Landfill Leachate Contamination of Water. *1973. Gulf South Research Institute (Baton Rouge, La.). 119 pp. $4.25.* Identifies materials that might prove useful in preventing permeation of leachate into ground water.

Methodology for Assessment of Urban Water Planning Objectives. *1973. Texas A&M University (College Station, Texas). 169 pp. $4.75.* An examination of the development, use, and management of water resources in San Antonio, Texas.

Use of Domestic Waste Glass for Urban Paving. *1973. University of Missouri (Rolla, Missouri). 106 pp. $6.45.* Summarizes research on the feasibility of using recycled glass as an aggregate for asphalt pavements.

Study of Lead, Copper, Zinc and Cadmium Contamination of Food Chains of Man. *1972. University of Missouri (Columbia). 121 pp. $4.25.* A statistical study, conducted in Southeastern Missouri, of the contamination of soil, vegetation, meat, and milk.

Photosynthetic Reclamation of Agricultural Solid and Liquid Wastes. *1973. University of California (Berkeley). 94 pp. $3.75.* A study of the development of an anaerobic fermentation and algae growth system to treat all farm wastes with as much material recovery as feasible.